



## NARASIMHA REDDY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad

Accredited by NAAC with A Grade, Accredited by NBA

### DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

#### QUESTION BANK

**Course Title** : Electrical Installation and Estimation  
**Course Code** : EE3105PE  
**Regulation** : NR20 (NRCM – NR20 Autonomous Syllabus)

#### Course Objectives

- To emphasize the estimation and costing aspects of all electrical equipment, installation and designs on the cost viability.
- To design and estimation of wiring
- To design overhead and underground distribution lines, substations and illumination.
- To develop the skill for repairs the electrical devices.
- To understand the IE rules of electrical wiring.

#### Course Outcomes (CO's)

<b>CO1</b>	Understanding the electrical system wiring, accessories and safety procedures required.
<b>CO2</b>	Understanding the OH lines. Design, estimate and applying the wiring layout of wiring schemes.
<b>CO3</b>	Understand , estimate and applying the OH lines & earthing
<b>CO4</b>	Understand the maintenance of Electrical Devices & Equipment and Estimating the costing of Repairs.
<b>CO5</b>	Understand the importance electrical rules and survey the rural electrifications

## UNIT-I

### **WIRING SYSTEMS AND SAFETY PROCEDURES**

S.No	Questions	BT	CO	PO
<b>Part – A (Short Answer Questions)</b>				
1	Write the uses of standard wire gauge or Explain Standard Wire Gauge to measure the size of the wire.	2	1	1,2
2	Classify different types of cables.	1	1	1,2
3	State the factors to be considered for the selection of wiring system.	2	1	1,2
4	State the advantages and disadvantages of conduit wiring system over other systems	1	1	1,2
5	State the Fuse? List out the various materials used for fuse element.	1	1	1,2
6	Explain the reason of fuse must be used in phase only and not in neutral wire or State the reason for not using fuse in a neutral wire	2	1	1,2
7	List out the types of fuses that are used in electrical wiring system.	1	1	1,2
8	List out the advantages and disadvantages of Cartridge fuses	1	1	1,2
9	State-the reasons for fire accidents in-electrical system	2	1	1,2
10	Write different safety procedures to be taken to avoid electric shock.	2	1	1,2
<b>Part – B (Long Answer Questions)</b>				
11	a) Explain the types wiring systems with neat sketches in detail.	2	1	1,2
	b) Compare the all kind of wiring and cable systems.	1	1	1,2
12	a) Explain the various types of wires/cables.	2	1	1,2
	b) Explain with a neat sketch -the construction and working of various types of fuses.	2	1	1,2
13	a) Explain how the gauge of a wire is measure by standard wire gauge.	2	1	2,3
	b) Explain the effects of shock and electrocution	2	1	2,3
14	a) Explain briefly CTS and TRS Systems of wirings with neat sketches and mention advantages, disadvantages and their applications.	2	1	1,2
	b) Explain the any for categories of controlling accessories in	2	1	1,2

		electrical wiring.			
15	a)	Explain briefly different types of conduit wiring systems with neat sketches and mention merits, demerits and their applications.	2	1	1,2
	b)	Explain with a neat sketch -the construction and working of Rewirable Fuse and state merits and demerits.	2	1	1,2
16	a)	Explain with a neat sketch the construction and working of HRC Fuse and mention advantages and disadvantages.	2	1	1,2
	b)	Explain the procedure to be adopted for shock treatment to an electrocution person.	2	1	2,3

## UNIT-II

### **ESTIMATION OF LIGHTING AND POWER LOADS**

S.No	Questions	BT	CO	PO
<b>Part – A (Short Answer Questions)</b>				
1	Define service main	1	2	1,2
2	State types of service mains in common use.	1	2	1,2
3	State different systems of wiring for domestic wiring system.	1	2	1,2
4	State the factors on which the choice of wiring system depends.	2	2	1,2
5	List the various types of interior wiring systems.	1	2	1,2
6	Draw the single line diagram of an electrical installation of a motor.	2	2	1,2
7	State different types of starters used for different motors.	2	2	1,2
8	Draw the wiring diagram from distribution pole to the motor pump set in an irrigation pump sets.	2	2	1,2
9	Draw the wiring diagram of a panel board switch board) in irrigation pump shed.	2	2	1,2
10	Write any three general IE rules while preparing internal wiring estimation.	1	2	1,2
<b>Part – B (Long Answer Questions)</b>				
11	a) Explain different types of service mains	2	2	2,3
	b) Draw the wiring layout for a big office building.	3	2	3,4
12	a) Estimate the quantity of materials required and their cost to make the surface type conduit wiring for a building, the plan of which is shown in Fig. Assume any missing data.	4,6	2	3,4,5

	b)	Draw the wiring layout for a workshop/electrical laboratory.	3	2	3,4
13	a)	Draw the wiring layout of a big hotel with four-storied building and with lift arrangement	3	2	3,4
	b)	<p>A 10H.P (metric), 415 V, 3-phase, 50 Hz squirrel-cage Induction motor is to be installed in a floor mill, the plan of which is shown in Fig. Show the layout of wiring diagram and estimate the quantity of materials required and their approximate cost. Assume any missing data.</p> <p style="text-align: center;"><b>Fig: Layout of Floor Mill</b></p>	4,6	2	3,4,5
14	a)	List different-material required for electrical installation of an electrical motor in a workshop	2,3	2	2,3
	b)	Write the steps involved in estimation of residential wiring.	3,4	2	3,4
15	a)	Write the estimation of submersible irrigation pump sets.	3,4	2	3,4
	b)	List different material required for electrical installation of an electric motor for irrigation pump set	2,3	2	2,3
16	a)	Explain the steps involved in estimation of power loads.	3,4	2	3,4
	b)	Explain the procedural steps involved in estimation of residential	3,4	2	3,4

	wiring.			
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### UNIT-III

#### **ESTIMATION OF OVERHEAD LINES AND EARTHING**

S.No	Questions	BT	CO	PO
<b>Part – A (Short Answer Questions)</b>				
1	State the main components of overhead line of transmission and mention their functions.	2	3	1,2
2	Write the types of insulators used in overhead lines.	1	3	1,2
3	Classify the earthing along with applications.	1	3	1,2
4	State the different ratings of transformers used for pole mounted substations.	2	3	1,2
5	Mention the purpose of earthing	2	3	1,2
6	Write the method of reducing earth resistance.	2	3	1,2
7	State the factors on which earth resistance depends and give the maximum permissible values of earth resistances.	2	3	1,2
8	State the main components required of pipe earthing.	1	3	1,2
9	State IE rule 31 related to placement of cutout on customer premises.	1	3	1,2
10	Write the different materials used in earth pit surrounding the earth electrode in any common electrical earthing system.	2	3	1,2
<b>Part – B (Long Answer Questions)</b>				
11	a) Explain the following for estimation of Over Headlines a) Cross Arms and Clamps b) Insulators	3,4	3	3,4,1 1
	b) Estimate the materials required for pipe earthing	3,4	3	3,4,1 1
12	a) Draw a neat sketch of a 100 kVA, 11 V/400 V, 3-phase pole mounted sub-station. And estimate the materials required for the erection of above sub-station.	3,4,5	3	3,4,1 1
	b) Draw a neat sketch of plate earthing and estimate the quantity of materials required.	3,4	3	1,2
13	a) Write any eight main components of overhead lines.	3,4	3	1,2
	b) Explain the important materials and their purpose or a plinth mounted substation with a neat sketch.	3,4	3	1,2
14	a) Draw and explain the construction of pole mounted 11kV/400V substation	3,4,5	3	3,4,1 1
	b) Draw and explain the construction of plinth mounted substation for above 250kVA capacity.	3,4,5	3	3,4,1 1

15	a)	Calculate the number of various insulators needed for the erection of 500 m, 3-phase, 11 kV overhead line with two angled points and two turning points. The length of span is 70 m.	3,4,5	3	3,4,1 1
	b)	Draw the neat sketch of 250 kVA, 11 kV/400v, and 3-phase pole mounted substation and prepare the schedule of materials for the erection of above sub-station.	3,4,5	3	3,4,1 1
16	a)	Estimate the quantity of material required for the installation of a 400 kVA, 11/0.4 kV, 3-phase plinth mounted sub-station with a neat sketch.	3,4,5	3	3,4,1 1
	b)	A 11kV line is to be erected to give supply to a village 2 km from existing 11 kV ne. Prepare a Schedule of materials required for the line. Assume an average span of 50 m and 2 cut points in line.	3,4,5	3	3,4,1 1

#### UNIT-IV

### **ESTIMATING AND COSTING OF REPAIRS AND MAINTENANCE OF ELECTRICAL DEVICES AND EQUIPMENT**

S.No	Questions	BT	CO	PO	
<b>Part – A (Short Answer Questions)</b>					
1	Draw wiring diagram for 3-phase induction motor.	1	4	1,2	
2	List various parts of an electric iron of 230 volt, 750 watt, single phase and also prepare required material quantity sheet for production of iron.	2	4	1,2	
3	Draw complete circuit diagram of DOL starter.	2	4	1,2	
4	List main components of overhead distribution system.	1	4	1,2	
5	Enlist reason for failure of line insulators.	2	4	1,2	
6	Define trouble shooting? List out different instruments use for trouble shooting.	2	4	1,2	
7	Draw and explain staircase wiring.	1	4	1,2	
8	Prepare list of Instruments used for repair and maintenance of electrical equipment.	1	4	1,2	
9	Prepare list of materials required for 415 volt, 3-phase,4 wire overhead distribution line with necessary specification	2	4	1,2	
10	Write factors to be considered for scientific estimation.	2	4	1,2	
<b>Part – B (Long Answer Questions)</b>					
11	a)	Estimate and costing of DOL starter.	3,4	4	3,4,1 1
	b)	Estimate and costing of automatic electric iron.	3,4	4	3,4,1 1
12	a)	Prepare cost schedule for ceiling fan.	3,4	4	3,4,1

	b)	Explain factors of Estimations of repairing of electrical equipments.	3,4	4	3,4,1 1
13	a)	Explain types of materials used in overhead line conductor.	1,2	4	1,2
	b)	Explain fault in house wiring and its remedies.	1,2	4	1,2
14	a)	Explain methods of preparing schedule of rates(SOR)	3,4	4	1,2
	b)	Draw figure of D.O.L. starter and write down its parts name	1,2	4	1,2
15	a)	Explain fault in house wiring and its remedies	1,2	4	1,2
	b)	Prepare estimation of repair and maintenance of ceiling fan.	3,4	4	3,4,1 1
16	a)	Prepare a material quantity sheet for table fan.	3,4	4	3,4,1 1
	b)	State advantages of preventive maintenance.	1,2	4	1,2

#### List of Spares For 10 A Motor Starter Type

S.NO	List if items	Qty	Price
1.	Thermal Overload Relay Unit	1	
2.	Air Break Contactor Type	1	
3.	Fixed Bakelite Base	1	
4.	Moving Bakelite Base	1	
5.	Spare Power Contact Kits	1	
6.	No Volt Coils	1	
7.	Auxilliary Contact Block	1	
	<b>Cost items</b>		<b>450</b>
	Labour cost		<b>150</b>
	<b>Total Cost</b>		<b>600</b>

#### For repair cost of 1kW electric iron/automatic iron

S.NO	List if items	Qty	Price
1.	<b>Pilot Lamp</b>	<b>1</b>	<b>30</b>
2.	<b>Handle</b>	<b>1</b>	<b>75</b>
3.	<b>The Cover Plate</b>	<b>1</b>	<b>150</b>
4.	<b>Nichrome Heating Element</b>	<b>1</b>	<b>70</b>
5.	<b>Steam Press Element</b>	<b>1</b>	<b>150</b>
6.	Spray Set	1	120
7.	Thermostat	1	150

	<b>Cost of items</b>	<b>745</b>
	Labour cost	<b>150</b>
	<b>Total Cost</b>	<b>895</b>

### For repair cost of ceiling / Table fan

S.NO	List if items	Qty	Price
1.	Fan Pipe	1 feet	20
2.	Fan Clamp	1	30
3.	<b>Mild Steel Cover</b>	1	<b>350</b>
4.	Fan Stator	1	<b>180</b>
5.	Fan Capacitor	1	30
6.	Fan regulator	1	120
7.	Fan ball bearings	2	60
	<b>Cost of items</b>		<b>790</b>
	Labour cost		<b>150</b>
	<b>Total Cost</b>		<b>940</b>

### UNIT-V

#### **DEPARTMENTAL TEST, REC AND ELECTRICAL ACT 2003**

S.No	Questions	BT	CO	PO
<b>Part – A (Short Answer Questions)</b>				
1	Name the departmental tests to be conducted before charging a new wiring installation	1	5	1,2
2	Mention are the important tests to be conducted before energizing a domestic wing installation?	2	5	1,2
3	Mention the important tests to be conducted before giving the supply to a small scale industry	2	5	1,2
4	Write the functions of rural electrification corporation.	1	5	1,2
5	Explain the need for load survey in a rural electrification scheme.	2	5	1,2
6	Explain State I.E. Rule 61, regarding earthing.	2	5	1,2
7	Write are the I.E. Rules followed for domestic and power wiring system?	2	5	1,2
8	State any two I.E. Rules for earthing metal supports of overhead	2	5	1,2



		distribution line.			
9		State I.E. Rules 31, related to placement of cutout on consumer's premises	2	5	1,2
10		Write the importance of I.E. Rules in electrical supply and distribution system.	1	5	1,2
<b>Part – B (Long Answer Questions)</b>					
11	a)	What are the departmental procedural steps to be followed to obtain domestic service connection?	2	5	2,3
	b)	Describe the following tests in brief. (a) Wiring continuity test (b) Insulation resistance test between conductors.	2	5	2,3
12	a)	(a) Write a brief notes on the load survey with regard to rural electrification. (b) Explain the procedure step by step to be followed electrifying a village.	2	5	2,3,4
	b)	Discuss in detail any four tests to be conducted before energizing the new electrical installation.	2,3	5	2,3
13	a)	Describe the procedure for following tests with relevant sketches. (a) Insulation Resistance, (b) Continuity test (c) Polarity test	2	5	2,3
	b)	Describe the step-by-step procedure for obtaining the electric supply for an L.T. consumer from TS. TRANSCO.	3,4	5	3,4
14	a)	Describe the following test in detail. (a) Continuity of wiring in an electrical installation. (b) Insulation resistance between conductors.	2	5	2,3
	b)	Explain load survey and state its uses in REC scheme.	2	5	2,3
15	a)	Write short notes on (a) Rural electrification (b) Load survey (c) Transformer location and capacity	2,3	5	2
	b)	A village has following loads and is to be electrified. (a) 50 No's domestic connections each of 200W (b) Agricultural pump sets 18 each of 5 H.P rating. Take efficiency of 85%, 0.8 p.f to the pump sets.	4,5	5	3,4,5

	(c) Two floor mills of 10 H.P. capacity Assume a diversity factor of 2, find the suitable rating of distribution transformer and prepare the necessary quantity estimate for the electrification of village. Assume the necessary date.			
16	a) The load particulars of a village are as given below. Domestic loads 200 No. each 300W Rice mills, 3 No., each 10 H.P Agricultural load, 10 No. each 7.5 H.P Diversity factor of the load: 1.5 Calculate the kVA rating of the distribution transformer needed in the village to feed the load and estimate the materials required.	4,5	5	3,4,5
	b) The load particulars of the villages are given below and determine the rating of the transformer to be installed in the load centre. (a) Agricultural load - 20 H.P. (b) Domestic load each 100 W - 60 No's (c) Small scale industries load each 4 kW - 3 No's (d) Commercial load - 6 kW Assume suitable diversity factor.	4,5	5	3,4,5

\* **Blooms Taxonomy Level (BT)** (L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analyzing; L5 – Evaluating; L6 – Creating)

#### Course Outcomes (CO)

<b>CO1</b>	Understanding the electrical system wiring, accessories and safety procedures required.
<b>CO2</b>	Understanding the OH lines. Design, estimate and applying the wiring layout of wiring schemes.
<b>CO3</b>	Understand , estimate and applying the OH lines & earthing
<b>CO4</b>	Understand the maintenance of Electrical Devices & Equipment and Estimating the costing of Repairs.
<b>CO5</b>	Understand the importance electrical rules and survey the rural electrifications

## Program Outcomes (PO)

1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
2	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12

**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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HOD, **EEE**



your roots to success...

## **State advantages of preventive maintenance.**

### **Protect Your People**

Keeping employees, maintenance workers, and vendors safe should be a top priority. Faulty equipment can cause serious injury or even death.

### **Protect Your Equipment**

Prevention is key to ensuring your property's electrical system is operating as safely as possible.

### **Reduce Disruptions**

Properly maintaining your systems and equipment helps to reduce any potential disruptions from loss of power.

### **Scheduled Downtime**

Planned maintenance allows you to schedule a system outage at a time of your choosing rather than having to correct major problems resulting from an unplanned and untimely failure.

### **Energy Efficiency**

Regularly maintained equipment is more energy efficient. Wear and tear can stress components leading to diminishing operation.

### **Save Money**

Replacing worn equipment rather than waiting for something to break can save you thousands in repair costs.

### **Extend Equipment Lifespan**

Extend the life of your existing electrical equipment by properly maintaining it.

Better Budgeting

**Poorly maintained electrical appliances have a higher chance of having unexpected breakdowns. By having a preventative maintenance plan in place, you can prevent these unexpected breakdowns from taking place. Additionally, you can predict and budget for any future repairs and replacements with a PM plan.**

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